Course Work

This is the course work requirement. You should design a convolutional code and its hard-decision and soft-decision Viterbi decoders using the given Program Template as the follows.

(1) Program a convolutional encoder;

(2) Program hard-decision and soft-decision Viterbi decoders;

(3) Simulate your program and obtain the bit error rate (BER) performance against the channel signal-to-noise ratio (SNR). (You can use excel or matlab to generate the figure.)

(4) * Repeat (3) by programing a BCJR decoder.

(5) * Repeat (3) by programing a Turbo encoder and decoder.

Note that (4)* and (5)* are optional based on your progress and its accomplishment will gain you merit.

BER: the ratio of error message bits to the total transmitted message bits.
SNR: In the AWGN channel, $y = x + n$ and $n \sim N(0, \sigma^2)$. SNR $= E_b/N_0$, where E_b is the energy per message bit and $N_0 = 2\sigma^2$.

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